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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,994	04/13/2004	Shoji Sadayama	S004-5267	4675
40627	7590	10/29/2007		
ADAMS & WILKS 17 BATTERY PLACE SUITE 1231 NEW YORK, NY 10004			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 10/29/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/822,994	<b>Applicant(s)</b> SADAYAMA ET AL.	
	<b>Examiner</b> Rodney G. McDonald	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                 | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5, line 3, is indefinite because "the channel" should be "the first channel".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1-3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chand et al. (U.S. PG Pub. 2002/0125427 A1) in view of Hong et al. (KR 2001-065673) and Ishitani et al. (Japan 11-219680).

Regarding claim 1, Chand et al. teach a method for manufacturing a split probe by channel processing a probe tip on a microcantilever comprising forming a split section by scanning and irradiating a central position using a focused ion beam so as to form a first channel. (Paragraph 0071-0073)

Regarding claim 3, Chand et al. teach the conductivity of the divided probe terminal is cut by forming a second channel connecting to the first channel at a conductive portion covering the cantilever either after or before processing of the probe tip. (Paragraph 0071)

Regarding claim 5, Chand et al. teach that the width of the second channel can be broader than that of the first channel. (Paragraph 0144; Fig. 44)

Regarding claim 6, Chand et al. teach that the processing depth during processing of the first and second channels is of an extent that does not pass through an insulation film at a lower part of a conductive film. (Paragraph 0071; Fig. 20)

Regarding claim 8, Chand et al. teach a method of manufacturing a split probe by channel processing a probe tip on a microcantilever. Chand et al. teach processing the probe tip. Chand et al. teach processing the whole cantilever in a horizontal portion and processing. (Paragraph 0071-0073)

The differences between Chand et al. and the present claims is that tilting the microcantilever around an axis is not discussed (Claims 1, 8), scanning and irradiating

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the probe tip of the tilted microcantilever with a focused ion beam to obtain a SIM image and deciding a central position for the probe tip from the acquired SIM image is not discussed (Claims 1, 8), the first channel also being formed from the opposite side of the probe which is oriented to the focused ion beam after being rotated 180 degrees around an axis vertical to the cantilever is not discussed (Claim 2), the processing being carried out by changing the tilt angle of the entire microcantilever a plurality of times is not discussed (Claim 7).

Regarding tilting the microcantilever around an axis claims 1, 8, Hong et al. teach tilting a microcantilever while milling a probe tip. (See Hong et al. Abstract)

Regarding scanning and irradiating the probe tip of the tilted microcantilever with a focused ion beam to obtain a SIM image and deciding a central position for the probe tip from the acquired SIM image claims 1, 8, Ishitani teach utilizing a focused ion beam to obtain a SIM image and determining a position for focused ion beam milling. (See Ishitani et al. Abstract; Partial Translation)

Regarding claim 2, Hong et al. teach rotating the probe 180 degrees about an axis vertical to the cantilever. (See Hong et al. Abstract)

Regarding claim 7, Hong et al. teach rotating and changing the tilt angle a number of times to achieve a particular milled area for a probe tip. (See Hong et al. Abstract)

The motivation for utilizing the features of Hong et al. is that it allows formation of probe tip. (See Hong et al. Abstract)

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The motivation for utilizing the features of Ishitani et al. is that it allows for satisfying high machining accuracy. (See Ishitani et al. Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Chand et al. by utilizing the features of Hong et al. and Ishitani et al. because it allows for formation of a probe tip and for satisfying high machining accuracy.

Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chand et al. in view of Hong et al. and Ishitani et al. as applied to claims 1-3 and 5-8 above, and further in view of Sugiyama (U.S. Pat. 6,177,670) and Celler et al. (U.S. Pat. 5,482,802).

The differences not yet discussed are where the focused ion beam processing current at the time of forming the second channel is larger than the focused ion beam processing current for forming the first channel (Claims 4, 9), the ion beam current during SIM is not discussed (Claim 9), and the ion beam current for ion beam milling is not discussed (Claim 9).

Regarding claims 4, 9, Chand et al. is discussed above and teach a first channel being smaller than a second channel. (See Fig. 40 for example) Sugiyama teach that a narrow ion beam is produced when the current is set to less than 5 pA. (See Sugiyama Column 3 lines 31-39) It therefore follows that since less current produces a smaller diameter ion beam that a smaller channel would require less current and that a larger channel requires more current.

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Regarding the ion beam current during SIM (Claim 9), Sugiyama teach utilizing an ion beam current set less than 5 pA. (See Sugiyama Column 3 lines 31-39)

Regarding the ion beam current for ion beam milling (Claim 9), Celler et al. teach that focused ion beam milling is usually carried out in the range of 10-1000 pA. (Column 4 lines 41-46)

The motivation for utilizing the features of Sugiyama is that it allows for controlling the size of the ion beam diameter. (See Sugiyama Column 3 lines 31-39)

The motivation for utilizing the features of Celler et al. is that it allows for ion beam etching. (Column 4 lines 41-46)

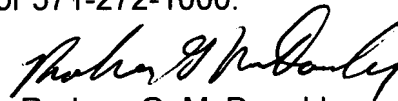
Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Sugiyama and Celler et al. because it allows for controlling the size of the ion beam diameter and for ion beam etching.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald  
Primary Examiner  
Art Unit 1795

RM  
October 24, 2007